



January 8, 2014

Project OD11161051

Mr. Roger Papler
Engineering Geologist
California Regional Water Quality Control Board
San Francisco Bay Region
1515 Clay Street, Suite 1400
Oakland, California 94612

Subject: Second Addendum to Work Plan to Evaluate Potential Vapor Intrusion
Intersil/Siemens Site, Indoor Air Study Area, Cupertino, California
Site Cleanup Requirements Order No. 90-119

Dear Mr. Papler:

On behalf of General Electric Company (GE) and SMI Holding LLC (SMI), AMEC Environment & Infrastructure, Inc. (AMEC) has prepared this *Second Addendum to the Work Plan to Evaluate Potential Vapor Intrusion* (Addendum) in the Off-Site Study Area of the Intersil/Siemens Superfund Site in Cupertino, California (the Site; Figure 1). The Addendum was prepared at the request of the California Regional Water Quality Control Board, San Francisco Bay Region (Water Board), and the United States Environmental Protection Agency (EPA). The Addendum includes a scope of work to perform additional activities related to the vapor intrusion evaluation for the Indoor Air Study Area (Figure 2), pursuant to a letter from the Water Board to GE and SMI dated December 11, 2013.¹

The December 11, 2013 letter required GE and SMI to address the following items:

- Cold weather residential indoor air sampling during the months of January and February 2014;
- Commercial indoor air sampling with the heating, ventilation, and air conditioning (HVAC) system turned off in the on-property building at the former Siemens property;
- Vapor intrusion evaluation in residential and commercial buildings where groundwater-TCE levels exceed 5 micrograms per liter ($\mu\text{g/L}$); and
- Comparison of indoor air sampling results to the TCE short-term removal action levels and USEPA's updated long-term TCE screening levels.

This Addendum addresses the first, third and fourth bullets. SMI is preparing a work plan concurrently that addresses the second bullet (commercial sampling with HVAC system off at the former Siemens facility) in the Water Board's December 11, 2013 letter.

¹ California Regional Water Quality Control Board (Water Board), 2013, Requirement for Vapor Intrusion Evaluation Workplan for 10900 and 10950 North Tantau Avenue, Cupertino, Santa Clara County, December 11.

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This Addendum is supplemental to the *Work Plan to Evaluate Potential Vapor Intrusion (Work Plan)*,² which was submitted by AMEC on behalf of GE and SMI on February 12, 2012. Specific information from the Work Plan that is also relevant to the additional investigation activities described in this Addendum is not repeated herein.

BACKGROUND

A detailed discussion of volatile organic compounds (VOCs) in groundwater and soil vapor in the vicinity of the Indoor Air Study Area is included in the Work Plan. In accordance with the Work Plan and supplemental documents,^{3,4} an indoor air evaluation was conducted at a commercial building and at residences in the Indoor Air Study Area in 2012 and early 2013. Indoor air, crawl space, and outdoor air sampling was conducted at six residences in July 2012, and at a seventh residence and the commercial building in January 2013. The indoor air investigation was documented in the *Report of Results—Evaluation of Potential Vapor Intrusion (VI Report)*, prepared by AMEC and submitted to the Water Board and EPA on December 20, 2013.⁵ On December 3, 2013, Kathleen Salyer of the EPA submitted a letter to Stephen Hill of the Water Board⁶ that provides changes to EPA's approach to vapor intrusion evaluations at Superfund sites led by the Water Board in the South San Francisco Bay Area. In response to EPA's guidance letter, the December 11, 2013 letter from the Water Board to GE and SMI specifies requirements for additional work related to the evaluation of potential vapor intrusion at the Intersil/Siemens site.

ADDITIONAL SAMPLING REQUIREMENTS

The action items from the December 11, 2013 letter from the Water Board to GE and SMI will be addressed in the manner described in the following sections.

Cold Weather Residential Indoor Air Sampling

In the December 11, 2013 letter, the Water Board requests collection of samples during January or February of 2014 (Water Board, 2013). Pre-field and field activities will be conducted as described in the Work Plan. Following sampling, the Summa canisters will be shipped to Eurofins Air Toxics Inc. (Air Toxics), a California Department of Public Health–certified laboratory, for analysis of the list of constituents of concern (COCs) presented in the Work Plan. The analysis will be performed using EPA Method TO-15 with selective ion monitoring (SIM) to achieve low-level reporting limits.

² AMEC Environment & Infrastructure, Inc. (AMEC), 2012a, *Work Plan to Evaluate Potential Vapor Intrusion, Intersil/Siemens Site, Indoor Air Study Area, Cupertino, California*, February 12.

³ AMEC, 2012b, *Revised Addendum to Work Plan to Evaluate Potential Vapor Intrusion, Former AMI Building 700/800, Cupertino, California*, August 20.

⁴ AMEC, 2012c, *Proposed Sample Locations and Additional Details, Former AMI Building 700/800, Cupertino, California*, November 27.

⁵ AMEC, 2013, *Report of Results—Evaluation of Potential Vapor Intrusion, Intersil/Siemens Site, Indoor Air Study Area, Cupertino, California*, December 20.

⁶ EPA, 2013, *Memorandum from Kathleen Salyer of the U.S. EPA to Stephen Hill, Chief, Toxic Cleanup Division, California Regional Quality Control Board*, December 3.

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The current Air Toxics reporting limits for 6-liter Summa canisters are included in Attachment 1 and are also presented in Table 1, along with a comparison to the Tier 2 and Tier 3 screening criteria.

Vapor Intrusion Evaluation above Groundwater with TCE greater than 5 µg/L

In the December 11, 2013 letter, the Water Board requests defining the vapor intrusion off-property study area as the area bounded by the estimated TCE shallow zone groundwater contamination area greater than 5 µg/L. Expansion of the Indoor Air Study Area to include the area bounded by the estimated TCE shallow zone groundwater contamination area greater than 5 µg/L would include addition of up to 8 residences on the north side of Lorne Way. We recommend that the Indoor Air Study Area for the Site not be expanded for the following reasons:

1. Indoor air sampling has been performed at seven residences in the Indoor Air Study Area, as documented in the VI Report (AMEC, 2013). These residences are above shallow groundwater with TCE concentrations up to 1,600 µg/L, including two residences adjacent to grab sample locations of 1,200 µg/L and 1,600 µg/L, significantly higher than the TCE concentrations ranging from <0.5 µg/L to 15 µg/L reported along Lorne Way (Figure 2). No COCs were detected in these two residences, or any of the other residences in the study area, with the exception of one residence where detections of tetrachloroethene (PCE) and TCE can likely be attributed to indoor sources. At this residence, carpets were recently cleaned and a hobby area is located in the attached garage; cleaning products and glues can contain both PCE and TCE. In addition, TCE and PCE were both detected at higher concentrations in indoor air than in crawl space air (AMEC, 2013).
2. The design and construction of the residences on both sides of Lorne way appear to be similar. The residences on both sides of Lorne Way were constructed in 1957, according to the Sunnyvale Community Development/Building Division.⁷ As is evident from the aerial photograph on Figure 3, the footprint and roof construction of each residence is very similar. Attachment 2 also includes a photo log of residences on the north side of Lorne Way. The visible presence of a grate or screen near the ground at most residences indicates that a crawl space is present under each residence.

Based on the above information, residences that would be included in an expanded Indoor Air Study Area are of the same construction (including a crawl space) as the residences in the current Indoor Air Study Area, which are over much higher groundwater concentrations of TCE and other COCs (up to 1,600 µg/L versus up to 15 µg/L). The COCs were not detected (or were likely detected because of indoor air sources) in the residences over the higher concentration groundwater. Therefore, we recommend that the Indoor Air Study Area not be expanded.

⁷ Personal communication between Alex Rosenthal of AMEC and the Daniel Reyna of the Sunnyvale Community Development/Building Division on December 19, 2013.

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Comparison of Results to TCE Short-term Removal Action Levels

The December 11, 2013 letter from the Water Board to GE and SMI indicates that the indoor air sampling results for TCE should be compared to the new TCE short-term removal action levels and the EPA's updated long-term PCE⁸ screening levels. These revised screening levels were incorporated into the VI Report (AMEC, 2013).

The revised screening levels will also be used for comparison to additional sampling results. Table 1 lists the COCs and their respective screening criteria for indoor/ambient air, as well as the laboratory reporting limits for each COC. As shown in Table 1, the laboratory reporting limits are lower than regulatory screening levels.

SCHEDULE AND DATA EVALUATION

A tentative schedule for the field activities is presented in Table 2. It is understood that EPA and AMEC will schedule a site walk in January 2014 to canvass the neighborhood and offer indoor air sampling. Following that, it is anticipated that within a week EPA will provide AMEC a list of which residences would like to have sampling conducted. AMEC will then order the appropriate sampling equipment, which should arrive within 2 weeks. (Without knowing which residences would require testing, AMEC would need to order approximately 60 Summa canisters to be prepared for all eventualities, which is not practical.) If the equipment is ordered after the residents are contacted, it should be possible to conduct the sampling approximately 3 weeks after the initial site walk.

Following receipt of the analytical testing results from Air Toxics, the data will be evaluated as outlined in the Work Plan. The results will be incorporated into an addendum to the VI Report, which will include conclusions and recommendations based on the sampling results. The report will be submitted in draft format to the Water Board and EPA within 8 weeks of receipt of the analytical testing results.

If any of the analytical testing results from the January/February 2014 sampling exceed the Tier 2 or Tier 3 screening criteria identified in the Work Plan (including the short term TCE screening levels discussed in this Addendum), the Water Board and EPA will be immediately notified and any necessary action taken, following discussion with the Water Board and EPA.

However, if the results from the January/February 2014 sampling do not exceed the Tier 2 or Tier 3 screening criteria, the results, coupled with the prior sampling results, demonstrate that vapor intrusion is not a risk for the residential properties and no further action will be necessary with regard to vapor intrusion in the Off-Site Study Area.

⁸ The letter refers to long-term TCE screening levels; however, the recent change to long-term screening levels referenced in the December 3, 2013 letter (EPA, 2013) is to long-term screening levels for PCE, not TCE.

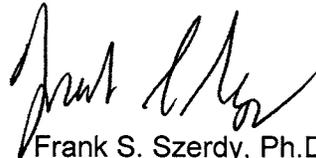
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If you have any questions or comments, please contact Avery Whitmarsh at 510-663-4154 or Susan Colman at 831-336-8155.

Sincerely,
AMEC Environment & Infrastructure, Inc.



Avery Whitmarsh, PG
Senior Geologist



Frank S. Szerdy, Ph.D., PE
Principal Engineer

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Enclosures: Table 1—Screening Criteria for Comparison of Indoor Air Results
Table 2—Proposed Field Schedule
Figure 1—Site Location
Figure 2—A1-Depth-Interval Groundwater in the Vicinity of the Indoor Air Study Area
Figure 3—Aerial View of Residences at Lorne Way
Attachment 1—Reporting Limits Provided by Air Toxics
Attachment 2—Photo Log of Residences North of Lorne Way

cc: Melanie Morash (morash.melanie@epamail.epa.gov)
Gary Jones, SMI Holding, LLC (gary.a.jones@me.com)
Chuck Hunnewell, SMI Holding, LLC (chuck.hunnewell@siemens.com)
Lance Hauer (Lance.Hauer@ge.com)
Susan G. Colman (sgcolman@comcast.net)
Ben Leslie-Bole (ben.leslie-bole@erm.com)
Heather Balfour (heather.balfour@erm.com)

TABLES

TABLE 1
SCREENING CRITERIA FOR COMPARISON OF INDOOR AIR RESULTS
 Intersil/Siemens Site, Indoor Air Study Area
 Sunnyvale, California

All concentrations are presented in micrograms per cubic meter ($\mu\text{g}/\text{m}^3$)

Chemical of Concern	Chloro- form	1,1-DCA	1,1-DCE	cis-1,2- DCE	trans-1,2- DCE	Freon 113	1,1,1-TCA	TCE	Toluene	PCE	Vinyl Chloride
Indoor Air and Outdoor Air Laboratory Reporting Limit (Summa Canisters using EPA Method TO-15 SIM) ¹	0.490	0.08	0.040	0.079	0.040	0.77	0.11	0.11	0.075	0.14	0.026
Tier 1—Comparison to Background/Outdoor Ambient Air											
Background (outdoor ambient air)	To be determined based on outdoor ambient air results.										
Tier 2—Comparison of Short-Term Health Based Screening Criteria											
Acute Inhalation MRL ²	NA	NP	NP	790 ³	790	NP	11,000	--	3,800	1,400	1,300
Intermediate Inhalation MRL ⁴	NA	NP	79	790 ³	790	NP	3,800	--	NP	NP	77
Interim Short-term Response Action Levels ⁵	--	--	--	--	--	--	--	2	--	--	--
Tier 3—Comparison to Long-Term Health Based Screening Criteria											
Residential Screening Level – Indoor Air ⁶	NA	1.5	210	63 ³	63	31,000	5,200	0.43	5,200	0.4 ⁷	0.16

Notes

1. Analytical laboratory reporting limits were provided by Eurofins Air Toxics, Inc. of Folsom, California. It should be noted that each reporting limit will be increased by a factor of 1.6 due to the dilution that occurs when the canister is pressurized by the laboratory prior to analysis.
2. Minimal Risk Levels (MRLs) for acute exposures (i.e., exposure durations of 1 to 14 days) for the inhalation pathway (ATSDR, 2013).
3. Value published for trans-1,2-DCE will be used as a surrogate for cis-1,2-DCE.
4. Minimal Risk Levels (MRLs) for intermediate exposures (i.e., exposure durations of >14 to 365 days) for the inhalation pathway (ATSDR, 2013).
5. Interim Short-term Response Action Level specified by USEPA Region 9 (EPA, 2013b). Value is based on a hazard index of 1. Exceedance of this concentration levels triggers mitigation; exceedance of this concentration by a factor of three triggers an immediate response.
6. Regional Screening Levels (RSLs) for residential air (EPA, 2013a). Lower of cancer or noncancer values presented.
7. The current RSL for PCE of 9.4 $\mu\text{g}/\text{m}^3$ reflects recent updates to PCE's toxicity criteria by EPA. California has not yet adopted these revised criteria. Therefore, the screening level for PCE is based on California's toxicity criterion and EPA's methods for estimating exposure.

TABLE 1
SCREENING CRITERIA FOR COMPARISON OF INDOOR AIR RESULTS
Intersil/Siemens Site, Indoor Air Study Area
Sunnyvale, California

Abbreviations

-- = not included

1,1-DCA = 1,1-dichloroethane

1,1-DCE = dichloroethene

cis-1,2-DCE = cis-1,2-dichloroethene

trans-1,2-DCE = trans-1,2-dichloroethene

Freon 113 = 1,1,2-trichloro-1,2,2-trifluoroethane

NA = not applicable; chloroform is measured as an indicator of connection between indoor air and sub slab samples and is not considered a COC for indoor air at this site (since chloroform was not detected in groundwater samples)

NP = not published

TCE = trichloroethene

PCE = tetrachloroethene

1,1,1-TCA = 1,1,1-trichloroethane

References

Agency for Toxic Substances & Disease Registry (ATSDR), 2013, Minimal Risk Levels (MRLs) for Hazardous Substances, July. <http://www.atsdr.cdc.gov/mrls/mrlolist.asp>

U.S. Environmental Protection Agency (EPA), Regions 3, 6, and 9, 2013a, Regional Screening Levels for Chemical Contaminants at Superfund Sites, November.

<http://www.epa.gov/region9/superfund/prg/>

U.S. Environmental Protection Agency (EPA), 2013b, Memorandum from Kathleen Salyer of the U.S. EPA to Stephen Hill, Chief, Toxic Cleanup Division, California Regional Quality Control Board, December 3.

TABLE 2

PROPOSED FIELD SCHEDULE
Intersil/Siemens Site, Indoor Air Study Area
Sunnyvale, CA

TASK	Week 1	Week 2	Week 3	Week 4
Contact residents	Canvass neighborhood with flyers regarding planned sampling and schedule.	EPA to continue communication with residents, if any contact EPA after the site walk.		
Determine which residences will have sampling conducted		EPA will inform AMEC of which residences would like sampling and what their availability is.		
Order sampling equipment		AMEC will order the appropriate sampling equipment for each home to be sampled (approximately 2 week turnaround).		
Collect indoor and outdoor ambient air samples				AMEC will Interview residents regarding their chemical use and inspect home with a low-level PID. Conduct indoor and outdoor air sampling program.

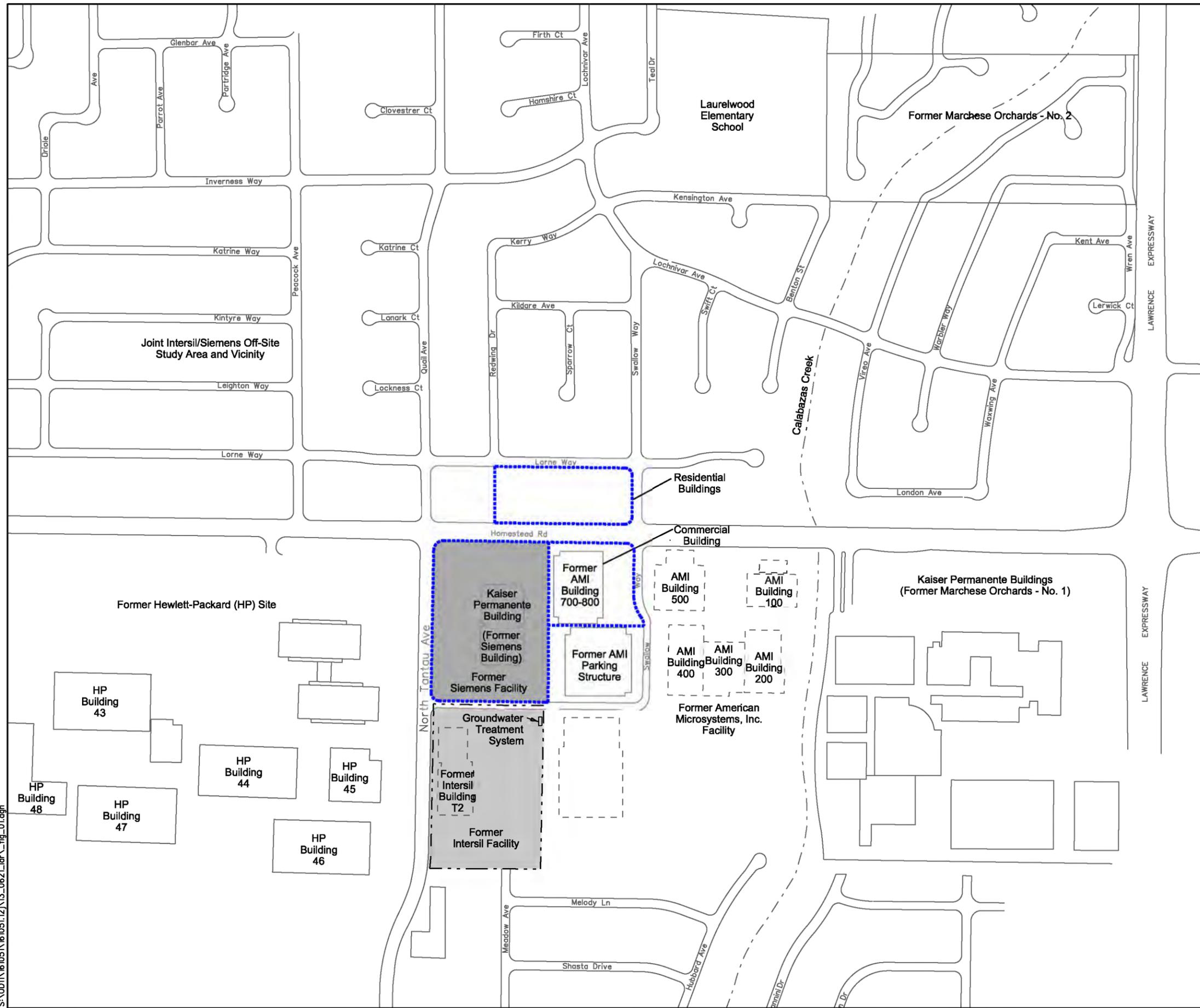
Abbreviations

EPA = U.S. Environmental Protection Agency

PID = photoionization detector

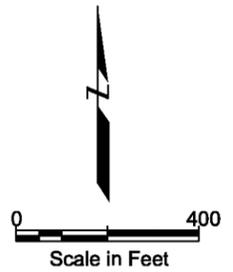
FIGURES

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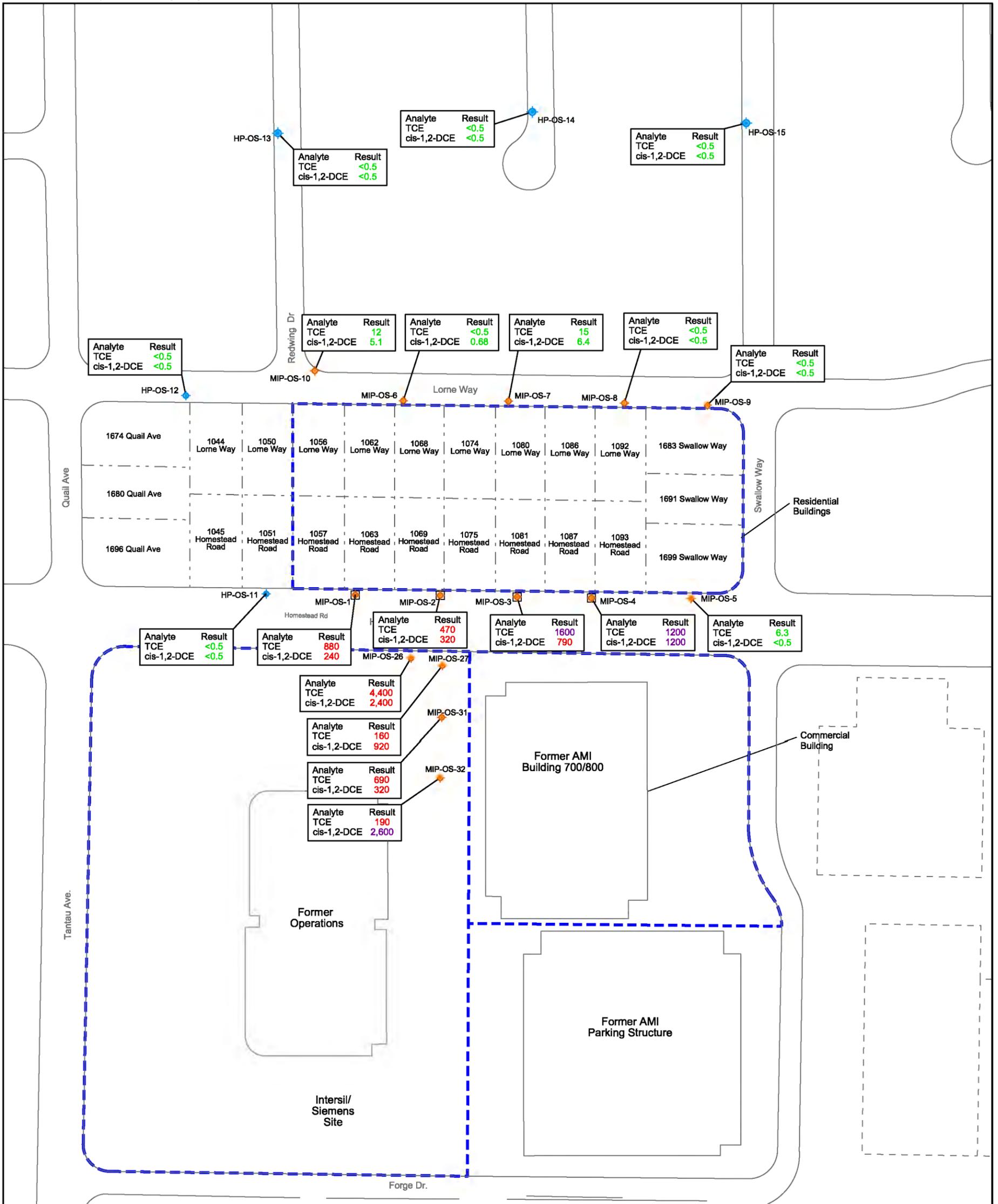


- EXPLANATION**
- - - - - Property boundary
 - - - - - Creek
 - ▭ Existing building
 - - - - - Demolished building
 - Former Siemens Facility
 - Former Intersil Facility
 - - - - - Indoor Air Study Area

- Notes:**
1. Basemap modified from plot plan: "Location of Monitoring Wells at Intersil Facilities," prepared by Ruth and Going, Inc., September 25, 1986, and November 1990, Job No. 17040-122.
 2. Intersil building T-2 demolished in 1997.



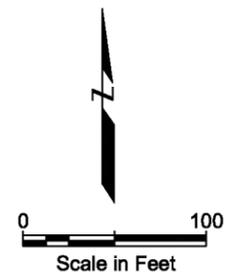
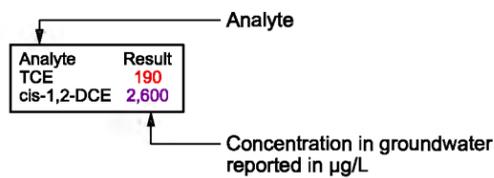
SITE LOCATION Intersil/Siemens Site, Indoor Air Study Area Cupertino, California		
By: AWP	Date: 1/8/2014	Project No. OD11161051.12J
		Figure 1



EXPLANATION

- - - Indoor Air Study Area
- ◆ Membrane interface probe (MIP) location (July 2011)
- ◆ Hydropunch location (HP) location (August 2011)
- TCE = Trichloroethene
- cis-1,2-DCE = cis-1,2-Dichloroethene
- µg/L = micrograms per liter

- Green : TCE/cis-1,2-DCE concentration <= 50 µg/L
- Orange : TCE/cis-1,2-DCE concentration 51-99 µg/L
- Red : TCE/cis-1,2-DCE concentration 100-999 µg/L
- Purple : TCE/cis-1,2-DCE concentration >= 1,000 µg/L
- : locations where soil gas sample collected at 10 feet below ground surface



Notes:
 1. Regional groundwater flow is to the north.
 2. Only groundwater data in the vicinity of the indoor air study area is presented on the figure.

**A1-DEPTH-INTERVAL GROUNDWATER IN THE VICINITY OF THE INDOOR AIR STUDY AREA
 Intersil/Siemens Site, Indoor Air Study Areas
 Cupertino, California**

By: AWP Date: 06/21/2013 Project No. OD11161051.12J



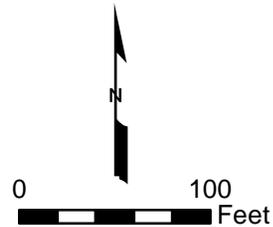
Figure **2**



Explanation

 Indoor Air Study Area

 Street address on Lorne Way



AERIAL VIEW OF RESIDENCES AT LORNE WAY
Intersil/Siemens Site
Cupertino, California

By: AR	Date: 12/20/2013	Project No. OD11161051.11E
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Figure	3
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ATTACHMENT 1

Reporting Limits Provided by Air Toxics

Method : Modified TO-15 Hi/Lo (Sp)-AMEC (GE Intersil)

Compound	Rpt. Limit (ugm3)
Vinyl Chloride	0.026
1,1-Dichloroethene	0.040
1,1-Dichloroethane	0.081
cis-1,2-Dichloroethene	0.079
1,1,1-Trichloroethane	0.11
Trichloroethene	0.11
Toluene	0.075
Tetrachloroethene	0.14
trans-1,2-Dichloroethene	0.40
Freon 113	0.77
Chloroform	0.49

Surrogate	Method Limits
1,2-Dichloroethane-d4	70-130
Toluene-d8	70-130
4-Bromofluorobenzene	70-130

Reporting Limits cited do not take into account sample dilution due to canister pressurization.

ATTACHMENT 2

Photo Log of Residences North of Lorne Way

ATTACHMENT 2
PHOTO LOG OF RESIDENCES NORTH OF LORNE WAY

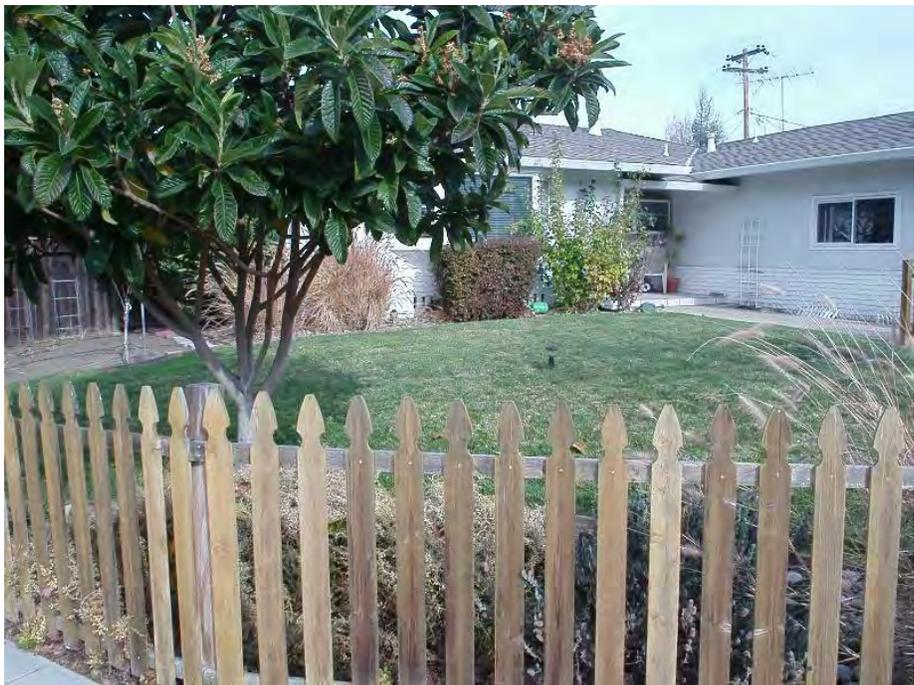


Photo 1, 1057 Lorne Way



Photo 2, 1063 Lorne Way

ATTACHMENT 2
PHOTO LOG OF RESIDENCES NORTH OF LORNE WAY



Photo 3, 1069 Lorne Way



Photo 4, 1075 Lorne Way

ATTACHMENT 2

PHOTO LOG OF RESIDENCES NORTH OF LORNE WAY



Photo 5, 1081 Lorne Way



Photo 6, 1087 Lorne Way

ATTACHMENT 2
PHOTO LOG OF RESIDENCES NORTH OF LORNE WAY



Photo 7, 1093 Lorne Way



Photo 8, 1099 Lorne Way